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NOTES AND LITERATURE

ICHTHYOLOGY

Ichthyological Notes.—One of the most valuable papers on the habits of fishes is a study in sexual selection by Cora D. Reeves, "On the Breeding Habits of the Rainbow Darter (*Ethcostoma cœruleum*)."[1]

Miss Reeves, a graduate student of Professor Reighard in the University of Michigan, has carefully watched the breeding habits of this dwarf perch, a species in which the males are most brilliantly marked with blue and scarlet.

It appears that the females do not select the brilliant males, that the oldest and strongest males are most brilliant, that the males know the females only by their color, that they mistake young uncolored males for females, and that the bright-colored males frighten away the younger ones by the display of their gaudy fins and by blows of the tail or head. The brilliant males were sucessful in pairing in 60 per cent. of the observed cases. The sexes as usual in vertebrates are equal in number, and the blue and scarlet colors belong to the males alone, these being most brilliant at the beginning of the season—about April first.

These observations give no support to the theory that the females choose the gaudy males. It appears however that the most brilliant males are the oldest and strongest, and that they leave most descendants. This form of the theory of sexual selection would seem to be applicable to bright-colored fishes generally.

Mr. E. W. Gudger[2] shows that the hammer-head shark (*Sphyma zygæna*) feeds on sting-rays and that the mouth and body of the shark are often full of broken-off stings, 50 of these being extracted from a single shark 12½ feet in length from Beaufort harbor.

Mr. Herbert W. Rand[3] discusses the functions of the spiracle of the skate, one of these besides the usual function of respiration is to keep the eyes clean by a jet of water.

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[1] *Biological Bulletin,* XIV, 1907.

[2] *Science,* XXV, p. 1005.

[3] Amer. Nat., XLI, p. 288.

MR. CHARLES R. STOCKARD[4] describes the development of the eggs of the killifish (*Fundulus heteroclitus*) in a solution of magnesium chloride.

In this fluid the young fishes develop as one-eyed monsters, the two eyes coalescing into a single median eye. This eye has a single lens. A mixture of sea-water with this solution gives the same effect. The influence of the magnesium salt is therefore supposed to cause the strange development of the eyes.

IN the *Proceedings* of the U. S. Nat. Mus., XXXIII, Jordan and Herre describe the cirrhitoid fishes of Japan, describing one new genus, Isobuna.

IN the same proceedings, Jordan and Richardson describe a new killifish, *Lucania browni,* from a hot spring in Lower California.

IN the same proceedings, Eigenmann & Cole record the species of South American Characin fishes in the National Museum and in the Museum of Indiana University, with numerous plates and descriptions of new species.

IN the same proceedings Professor Edwin Linton describes the worms parasitic on fishes of Bermuda.

IN Bureau of Fisheries Document No. 627, Mr. F. M. Chamberlain records his observations on the salmon and trout of Alaska.

Among other matters of interest it is noted that a majority of the young red salmon spend their first winter in the lakes, while the other species leave early for the sea. It is long known that the red salmon never enter a stream that has not a lake in its course and that they always spawn in streams above a lake. The other four species of Alaska salmon have no special relation to lakes.

Mr. Chamberlain's observations do not confirm the "homing theory." Marked salmon fry from the Naha River appeared as adults at Yes Bay. Most of the fishes however seem to return to the parent stream, from which they probably never wander very far.

Four years is shown to be the usual age of maturity of king salmon and red salmon, while the humpback is probably adult at an earlier period.

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[4] *Archiv Entwicklungs Mech.,* XXIII, p. 249.

Mr. Chamberlain's paper contains many valuable facts in relation to the life of salmon, the fruit of nearly four years observation in southern Alaska.

In the *Proceedings* of the Biological Society of Washington (XX, 1907) Evermann and Goldsborough give a check list of the fresh-water fishes of Canada. 145 species are recorded, with a complete list of localities.

In the *Proceedings* of the same society (XXI, 1908), Dr. Evermann describes two new fishes (*Fundulus meeki* and *Salmo nelsoni*) from streams in lower California. The last-named, an isolated troutlet from Mount San Pedro Martir, is especially interesting as occurring farther to the southward than any other known trout. It is apparently an offshoot of the rainbow trout of California, *Salmo irideus.*

In the same *Proceedings* (XXI, 1908) Jordan and Grinnell describe another isolated dwarf waif among the trouts, as *Salmo evermanni.* This troutlet occurs on the headwaters of the Santa Ana River, on Mt. San Gorgonio, in San Bernardino Co., California. It is shut off from the parent form, *Salmo irideus,* by a waterfall, and in isolation it has undergone considerable change. Its origin is parallel with that of the three species of golden trout of the high Sierras. *Salmo evermanni,* living on gray granite, is dull in color with none of the scarlet shades of the golden trout.

In the same connection Jordan and Snyder describe and figure the great Kamloops trout from Lake Kootenay in British Columbia. The specimen figured, sent by John P. Babcock, Fish Commissioner of British Columbia, weighed 22 pounds. This species is an offshoot of the steelhead trout, *Salmo rivularis.*

In the *Bulletin* of the Bureau of Fisheries, XXV, for 1906 (October 25, 1907), Jordan and Snyder record a number of new species from Hawaii, with several plates, four of them in color. The new species are *Caraux dasson, Ariommus evermanni, Rooseveltia aloha, Thalassoma neanis* and *Scaridea aërosa.*

The advent of Japanese fishermen in Hawaii has caused many very rare deep-water fishes to be common in the markets; among these is the type species, *Rooseveltia brighami,* of the genus named for the naturalist Theodore Roosevelt. This species, scarlet and gold, is one of the most brilliant in Hawaiian waters.

In the same *Bullein,* Dr. M. X. Sullivan discusses in detail the digestive tract in sharks.

In the same *Bulletin* (Vol. XXVI, 1907), Evermann and Goldsborough give a catalogue of the Fishes of Alaska, with many plates, based primarily on the collections made by the Albatross in 1903, under the direction of Jordan and Evermann. The following new species are described and figured:

Polistotrema deani
Sebastodes swifti
Icelinus burchami
Coltus chamberlaini
Blennicoltus clarki
Pholis gilli
Lumpenus longirostris
Lycodes jordani

Many corrections in synonymy are made. One of these the present writer does not accept. He believes that the two large rays of Monterey Bay, *Raja stellulata* and *Raja rhina,* are both distinct from *Raja binoculata* and from each other. The authors have overlooked *Bryostemma tarsodes* described from Alaska by Jordan and Snyder.

This paper is a most useful one to students of Alaskan fishes.

In the *Journal* of the Imperial Fisheries Bureau of Japan, Dr. K. Kishinouye describes the natural history of the sardine of Japan (*Sardinella melanosticta*) and the related species.

For some unexplained reason, he unites the Pacific herring *Clupea pallasi* with the Atlantic *Clupea harengus.* New species of sardine are described under the names of *Clupea immaculata, Clupea okinawensis* and *Clupea mizun.* These belong to Sardinella, and the last two are from the Riu-Kiu Islands. A new anchovy is described as *Engraulis koreanus.* This should belong to the modern genus Anchovia, being very different from *Engraulis japonicus.*

In the *Journal* of the College of Science, of the Imperial University of Tokyo (XXI, 1907), Professor S. Hatta of Sapporo describes the gastrulation of the embryo of the lamprey.

In the *Proc. Zool. Soc., London* (1906), Professor Bashford Dean has notes on living specimens of the Australian lung-fish (*Neoceratodus forsteri*). Its movements are notably those of an amphibian rather than a fish.

In the *Annals* of the Museum of Natal, Mr. C. Tate Regan describes new species from that coast. A species of remarkable interest is a new saw-shark, *Pliotrema warreni,* with six gill-slits.

IN the *Annals* of the Museum of Vienna, XXI, 1906, Dr. Viktor Pietschmann has a valuable record of the fishes collected in a voyage to Iceland, and another to Morocco.

IN *Records* of the Australian Museum, VI, 1907, Allan R. McCulloch describes the fishes and crustaceans taken by the Woy Woy, in deep waters of the Tasman Sea. The most notable of the new species is the sculpin-like fish, *Hoplichthys haswelli*.

IN the *Journal of the Linnæan Society of London,* Mr. A. D. Darbishire describes the water current in the spiracle of sharks.

IN the *Sitzber.* of the same museum, Vienna, Vol. 116, 1907, Dr. Viktor Pietschmann describes new sharks from Japan, *Centrophorus steindachneri* and *Etmopterus frontimaculatus*.

The last species was also taken by Jordan and Snyder in Sagami Bay, in company with *Etmopterus lucifer*. It is one of the smallest of sharks, black, with a milk-white spot on the top of the head.

IN the *Proc. Zool. Soc., London* (1907), Mr. Regan redescribes *Velifer hypselopterus,* a Japanese species not seen in the last fifty years, from three specimens in the British Museum. A second species from northern Australia is described as *Velifer multiradiatus*.

In another paper Mr. Regan brings together the aberrant genera Lampris, Velifer, Trachypterus and Lophotes, framing of these a new suborder *Allotriognathi*. These fishes, like the Berycoids have an orbitosphenoid, but no mesocoracoid bone.

Mr. Regan thinks that these fishes are derived from the berycoids, and the latter from forms like the extinct *Ctenothrissa* and *Pseudoberyx*. These observations of Mr. Regan are very interesting and his conclusions seem reasonable. He notes that Semiophorus is allied to Platax and not to Lampris.

IN ''Wissenschaftliche Ergebnisse einer Zoologischen Expedition nach dem Baikal-See'' (1907), Dr. Leo Berg discusses the sculpin-like fishes of Lake Baikal, the Cottidæ, Cottocomephoridæ and Comephoridæ. The excellent monograph is preceded by a careful account, fortunately in German not Russian, of the osteology of these fishes. Of the 34 species of fishes found in Lake Baikal 17 are endemic, or developed in the lake, not occurring elsewhere. Of these, two genera, Comephorus and Cottocomephorus, each constitutes a distinct family. Other genera peculiar to this lake are Abyssocottus, Cottinella, Limnocottus, Procottus, Batrachocottus and Asprocottus. The fauna described in this paper is one of peculiar interest.

IN another paper in the *Annuaire de l'Académie de St. Petersbourg,* XI, 1906—unfortunately entirely in Russian—Mr. Berg discusses the Old World species of minnows of the genus Phoxinus.

IN the same *Annuaire,* vol. XII, 1907, Mr. Berg treats in Russian and in English, the fresh-water fishes of Corea. The genus Longurio of Jordan and Starks is united by Berg to Saurogobio of Bleeker, and Fusania with Aphyocypris of Günther. In another paper Mr. Berg discusses Siberian species of Rhodeus.

IN the "Fauna America-Centrali" Mr. C. T. Regan continues his account of the fishes of Mexico and Central America. *Amiurus meeki* is described from Chihuahua, *Moxostoma mascotæ* from Jalisco, *Algansea affinis* from Rio Lerma, *Algansea stigmatura* from Rio Grande de Santiago. Several species recognized by other authors are placed in synonymy. In some cases this process exchanges one doubtful opinion for another.

IN *Popular Science Monthly,* LXXI, January, 1908, Dr. Jordan describes "The Grayling at Caribou Crossing," a running descriptive account of the Yukon country, with a dash of angling.

IN *Science,* XXVI, 1907, Dr. Bashford Dean reviews Dr. Eastman's recent papers on the "Kinship of the Arthrodires," Dr. Eastman claims that these mailed fishes are Dipnoans and to this conclusion Dr. Dean enters a "friendly protest."

IN the *American Journal of Anatomy,* VII, 1907, Dr. Dean discusses the structure and origin of the Acanthodian sharks, one of the most primitive of the extinct forms. Their relationships are with Cladoselache, a form having fins of the fin-fold type, and probably the most primitive of known sharks.

IN *Archives de Zoologie Experimentale,* VII, 1907, Dr. Louis Fage describes the fishes of the Balearic Islands, with several new species. The paper can be especially praised for its attention to laws of nomenclature, as also for the accuracy and fullness of its accounts of the new forms. Two species are referred to the genus Eleotris, a group not hitherto recorded from Europe. Neither of the species, however, belongs to Eleotris proper. *Eleotris pruvoti* is an ally of Valenciennea and *Eleotris balearica* approaches Gymneleotris.

DR. JACQUES PELLEGRIN publishes in the "Mission Scientifique," 1907, an account of the fishes of the high mountain lakes of South America.

IN a weekly Journal, the *Sydney Mail,* Mr. Charles Thackeray gives a readable and accurate account of the game fishes of New South Wales, with wood cuts of the leading species.

ECHINODERMATA

The Stalked Crinoids of the Siboga Expedition.[1]—There has recently been published a monograph on the recent stalked crinoids of the East Indies, based on collections made by the *Siboga* which is the first important contribution to our knowledge of the group since the publication of Dr. P. Herbert Carpenter's great work (the *Challenger* report) in 1884.

The first thing to attract the attention of the student of the recent crinoids is the announcement of the discovery of the infrabasals in a species of Metacrinus, *M. acutus,* a new species here first described. Dr. Carpenter stoutly maintained that infrabasals did not occur in any species of recent crinoid, and he criticized rather sharply the so-called law of Wachsmuth and Springer, by the application of which the recent genera Isocrinus and Metacrinus were shown to be dicyclic. He dissected numerous specimens of various species of both genera, and according to his statements and figures, appeared to conclusively prove their absence. In 1894 the Swiss paleontologist de Loriol discovered and figured infrabasals in a fossil species of Isocrinus, and now Professor Döderlein shows their presence in Metacrinus. This discovery by Dr. Döderlein was made simultaneously by the present reviewer in two other species of Metacrinus and in *Isocrinus decorus* and announced in a paper now in press, which had gone through the final proof before Dr. Döderlein's contribution was received. In this the infrabasals of *Metacrinus rotundus* from Japan and of *M. superbus* from the China Sea, and of *Isocrinus decorus* from Cuba are described and figured.

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[1] Die Gestielten Crinoiden der | Siboga-expedition | von | L. Döderlein. | Monographie XLIIa aus | Uitkomsten op Zoologisch, | Botanisch, Oceanographisch en Geologisch gebied | verzameld in Nederlandsch Oost-Indië 1899–1900 | aan boord H. M. Siboga onder commando van | Luitenant ter zee 1^e Kl. G. F. Tydeman | uitgegeven door | Dr. Max Weber.